

Modern Web Programming

Software Languages Team
University of Koblenz-Landau
Ralf Lämmel and Andrei Varanovich

What is Web programming?

wikipedia web programming

https://www.google.de/search?q=wikipedia+web+programming&rlz=1C1CHFA_enDE485DE485&sugexp=chrome,mod=15&sourceid=chrome&ie=UTF-8

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Web [Web development - Wikipedia, the free encyclopedia](#)
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Web development is a broad term for the work involved in developing a web site for the Internet (World Wide Web) or an intranet (a private network). This can ...

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en.wikipedia.org/wiki/Programmer
From Wikipedia, the free encyclopedia ... The term programmer can be used to refer to a software developer, Web Developer, Mobile Applications Developer, ...

[Web developer - Wikipedia, the free encyclopedia](#)
en.wikipedia.org/wiki/Web_developer
From Wikipedia, the free encyclopedia ... A web developer is a programmer who

From Wikipedia, the free encyclopedia



This article **may need to be rewritten entirely to comply with Wikipedia's quality standards**. You can help. The discussion page may contain suggestions. (May 2009)



It has been suggested that this article or section be merged with [Web engineering](#). (Discuss) Proposed since May 2010.

Web development is a broad term for the work involved in developing a [web site](#) for the Internet ([World Wide Web](#)) or an [intranet](#) (a private network). This can include [web design](#), [web content development](#), [client liaison](#), [client-side/server-side scripting](#), [web server](#) and [network security configuration](#), and [e-commerce](#) development. However, among web professionals, "web development" usually refers to the main non-design aspects of building web sites: writing [markup](#) and [coding](#). Web development can range from developing the simplest static single page of plain [text](#) to the most complex web-based [internet applications](#), [electronic businesses](#), or [social network services](#).

For larger organizations and businesses, web development teams can consist of hundreds of people ([web developers](#)). Smaller organizations may only require a single permanent or contracting [webmaster](#), or secondary assignment to related job positions such as a [graphic designer](#) and/or [information systems](#) technician. Web development may be a collaborative effort between departments rather than the domain of a designated department.

Web engineering

Visited 4 Sep 2012

From Wikipedia, the free encyclopedia

The web has become a major delivery platform for a variety of complex and sophisticated enterprise applications in several domains. In addition to their inherent multifaceted functionality, these web applications exhibit complex behavior and place some unique demands on their usability, performance, security and ability to grow and evolve. However, a vast majority of these applications continue to be developed in an ad-hoc way, contributing to problems of usability, maintainability, quality and reliability.^{[1][2]} While web development can benefit from established practices from other related disciplines, it has certain distinguishing characteristics that demand special considerations. In the recent years, there have been some developments towards addressing these problems and requirements. As an emerging discipline, **web engineering** actively promotes systematic, disciplined and quantifiable approaches towards successful development of high-quality, ubiquitously usable web-based systems and applications.^[3] In particular, web engineering focuses on the methodologies, techniques and tools that are the foundation of web application development and which support their design, development, evolution, and evaluation. Web application development has certain characteristics that make it different from traditional software, information system, or computer application development.

Web engineering is multidisciplinary and encompasses contributions from diverse areas: [systems analysis and design](#), software engineering, hypermedia/hypertext engineering, requirements engineering, human-computer interaction, user interface, information engineering, information indexing and retrieval, testing, modelling and simulation, project management, and graphic design and presentation. Web engineering is neither a clone, nor a subset of software engineering, although both involve programming and software development. While web Engineering uses software engineering principles, it encompasses new approaches, methodologies, tools, techniques, and guidelines to meet the unique requirements of web-based applications.

In this short course, we will focus on programming concepts and hands-on programming.

Web application

From Wikipedia, the free encyclopedia

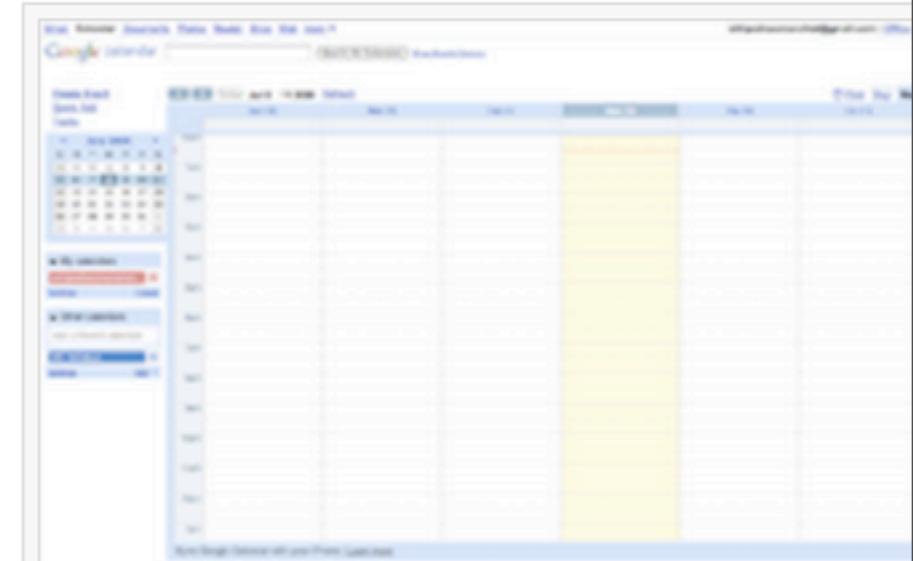
For applications accessed through the web that are executed client-side, see [Rich Internet application](#).



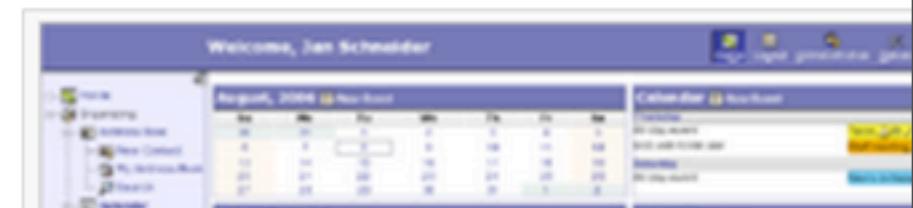
This article **needs additional citations for verification**. Please help improve this article by adding citations to reliable sources. Unverified material may be challenged and removed. (January 2010)

A **web application** is an [application](#) that is accessed by users over a network such as the [Internet](#) or an [intranet](#).^[1] The term may also mean a computer software application that is coded in a browser-supported language (such as [JavaScript](#), combined with a browser-rendered [markup language](#) like [HTML](#)) and reliant on a common web browser to render the application [executable](#).

Web applications are popular due to the **ubiquity** of web browsers, and the convenience of using a web browser as a **client**, sometimes called a **thin client**. The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity, as is the inherent support for cross-platform compatibility. Common web applications include **webmail**, **online retail sales**, **online auctions**, **wikis** and many other functions.



[Google Calendar](#) is a contact- and time-management web application offered by Google.



A **Web application** (WA) is a software system based on technologies and standards of the WWW that provides Web-specific resources such as content and services and is accessed via a user interface -- the Web browser.

Kappel, Pröll, Reich, and Retschitzegger: Web Engineering, Wiley, 2006.

Principle architecture of WA

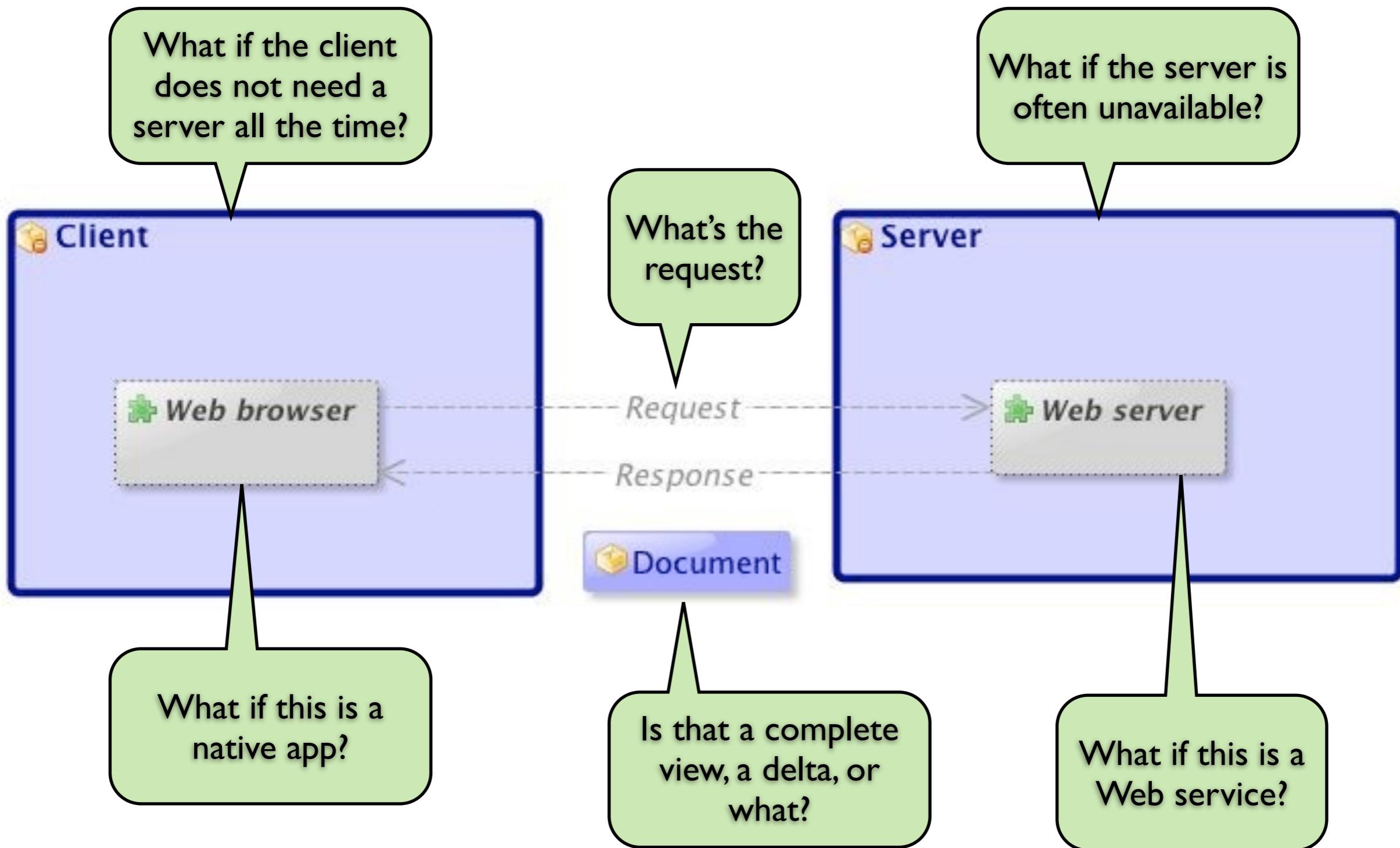
- It is essentially a Client-server architecture.
- Endusers access a ***client*** (in a Web browser).
- Services are implemented on a (Web) ***server***.
- Services are materialized as ***documents***.
- Client & server cooperate via ***protocols*** over the internet.

supports rendering
and interaction with
HTML pages

delivers Web pages
over HTTP

describe message formats and
rules for exchanging messages

WA architecture



Demo

A Web application for a simple human-resources management system.

[http://101companies.org/index.php/
101implementation:html5local](http://101companies.org/index.php/101implementation:html5local)

No internals are discussed at this point.
Appearance and architecture options are discussed.

Web application framework

From Wikipedia, the free encyclopedia

A **web application framework** ("WAF") is a [software framework](#) that is designed to support the [development](#) of dynamic websites, web applications and [web services](#). The framework aims to alleviate the overhead associated with common activities performed in Web development. For example, many frameworks provide libraries for [database access](#), [templating frameworks](#) and [session management](#), and they often promote [code reuse](#).^[1] For a comparison of concrete web application frameworks, see [Comparison of web application frameworks](#).

[1 History](#)

[2 Types of frameworks](#)

[2.1 Model–view–controller \(MVC\)](#)

[2.2 Push-based vs. pull-based](#)

[2.3 Three-tier organization](#)

[2.4 Content management systems](#)

[3 Features](#)

[3.1 Web template system](#)

[3.2 Caching](#)

[3.3 Security](#)

[3.4 Database access, mapping and configuration](#)

[3.5 Scaffolding](#)

[3.6 URL mapping](#)

[3.7 Ajax](#)

[3.8 Web services](#)

The following 161 pages are in this category, out of 161 total. This list may not reflect recent changes ([learn more](#)).

- Comparison of web application frameworks
- List of Ajax frameworks
- Web application framework

A

- AccDC
- Agavi
- AIDA/Web
- Ajax framework
- Ample SDK
- Apache Shale
- Apache Sling
- Apache Tapestry
- Apache Wicket
- AppFlower
- AppFuse
- Template:Application frameworks
- Apusic OperaMasks
- ASP.NET
- ASP.NET MVC Framework
- ATL Server
- Axiom CMS

B

- Barracuda (Java)
- Base One Foundation Component Library

F cont.

- Fusebox (programming)

G

- Geomajas
- Google Apps Script
- Grails (framework)
- Gurupa

H

- Hamlets
- Hammerkit
- Hobo (software)
- Horde (software)
- Humax Raiya Programming

I

- IBM WebSphere Application Server
- IBM WebSphere Application Server Community Edition
- ICEfaces
- Interchange (software)
- ItsNat

J

- Java Platform, Enterprise Edition
- JavaServer Faces
- Javeline platform

P cont.

- PhpCodeGenie
- PHPRunner
- PhpWebSite
- Pier (software)
- Play Framework
- Plone (software)
- PRADO Framework
- ProcessWire
- Project Zero

Q

- Qcodo
- Quinoa Framework

R

- Ramaze
- Rango (web framework)
- Reaction (software)
- Reasonable Server Faces
- RichFaces
- RIFE
- Rivista
- RNA Framework
- Ruby on Rails
- Run BASIC
-
-
-

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- Apache Tapestry
- Apache Wicket

F cont.

- Fusebox (programming language)

G

- Geomajas
- Google Apps Script
- Grails (framework)
- Gurupa

H

- Hamlets
- Hammerkit
- Hobo (software)
- Horde (software)
- Humax Raiva Pro

Guiding questions

- How to do a course on web programming?
- What are the characteristics of web applications?
- Should we perhaps also include ‘native’ applications?
- Do all web applications rely on ‘frameworks’?

What are the characteristics
of Web applications?

(... of WA *development*?)

Rich functionality

Search results - rlaemmel@gmail.com

https://mail.google.com/mail/u/0/#search/debeka

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debeka

Gmail

COMPOSE

Inbox (9,148)

Starred

Sent Mail

Drafts (247)

Circles

[Imap]/Drafts

[Imap]/Sent

[Imap]/Trash

101user

You are invisible.
Go visible

Rich functionality

debeka

1-20 of many

Ute, me (2) Re: Debeka-Seminar am 14.9., 7.9. 3:30 am

Ellen, me (4) Wie geht es Dir? - Ganztagesprogramm für C Sep 3

Andrei, me (2) NoSQL - plan - for the Debeka course. The ic Aug 31

Andrei, me (3) hsonto -- back-linking to the books - Aug 29

Andrei, me (4) My meeting with Thomas tomorrow - plan - w Aug 29

Andrei, me (2) NoSQL - on the Debeka course > materials. I Aug 29

Ute, me (2) Inbox Debeka-Seminar, 14.9.2012 - Schmi Aug 23

Andrei Varanovich (2) Github Pricing - for our Debeka courses, notr Jul 22

Dorothee, me (2) Re: Fwd: Fwd: Sponsoring der Sommerschul Jul 13

Ralf Laemmel Debeka als Sponsor des akademischen IT E Jul 10

me (2), Draft Sponsoring der Sommerschule Software Tec Jul 4

Prof. Dr. Maria A. Wimmer Inbox Fwd: Unterlagen Selbstevaluation UI May 14

Jürgen, Andrei, me (9) Debeka-Semianare - 2012/5/3 Jürgen Ebert : May 3

Jürgen Ebert Inbox Termine für die Debeka-Seminare - I May 3

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	nach	Koblenz, Universitätsstr.	<input type="button" value=""/>	14:00	<input type="button" value=""/>	<input type="radio"/> Abfahrt <input type="radio"/> Ankunft
<input type="button" value="Aktualisieren"/>						
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Koblenz Hbf	Do, 06.09.12	an 15:11	3	Fahrradmitnahme reservierungsabhängig, Fahrradmitnahme begrenzt möglich, Bordrestaurant → Umsteigezeit anpassen
Fußweg 7 Min.				
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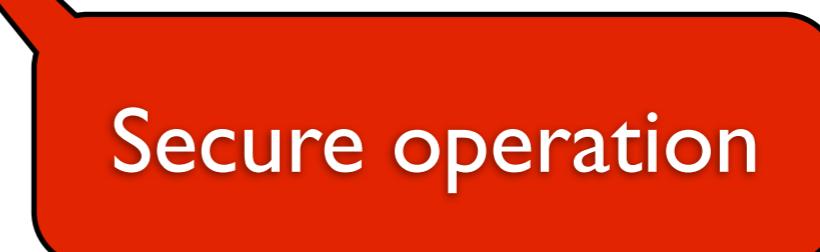
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Branch (three-digit) Account (seven-digit) Sub-account (two-digit) PIN (five-digit)

00

Directly to ... Session-TAN for Brokerage

IMPORTANT Deutsche Bank never asks for more than one TAN per transaction!



Secure operation

Samsung Galaxy Note 10.1

www.amazon.de/Samsung-GT-N8000EAADBT-Quad-core-Megapixel-deep-gray/dp/B008UM3VJW/ref=sr_1_1?ie=UTF8&qid=1346864617&sr=8-1

amazon.de RALFs Amazon Angebote Gutscheine Hilfe Impressum

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von [Samsung](#)

Farbe: deep-gray

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NETFLIX

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Watch TV shows & movies anytime, anywhere. Only \$7.99 a month.

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Watch on your PS3, Wii, Xbox, PC, Mac

Shows & movies streamed instantly over the internet

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Scalable implementation

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www.apple.com/de/mac/

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MacBook Air MacBook Pro Mac mini iMac Mac Pro OS X Mountain Lion

Mac Programme Zubehör Server

Slick appearance

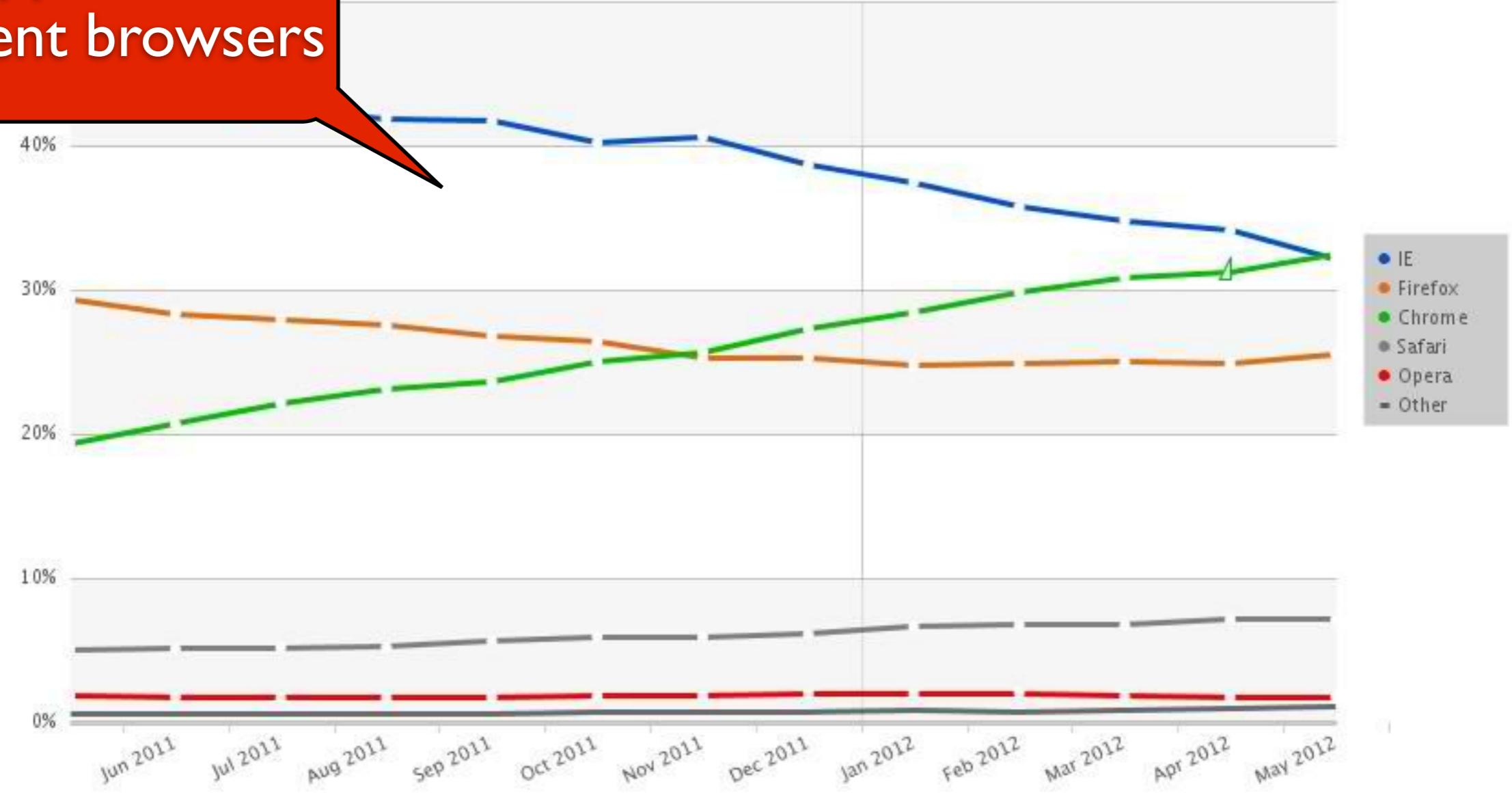
Das neue
MacBook Pro
mit Retina Display

Die völlig neue Sicht aufs Notebook.

MacBook Air MacBook Pro OS X Mountain Lion ist da.

Support for
different browsers

StatCounter Global Stats
Top 5 Browsers from May 2011 to May 2012

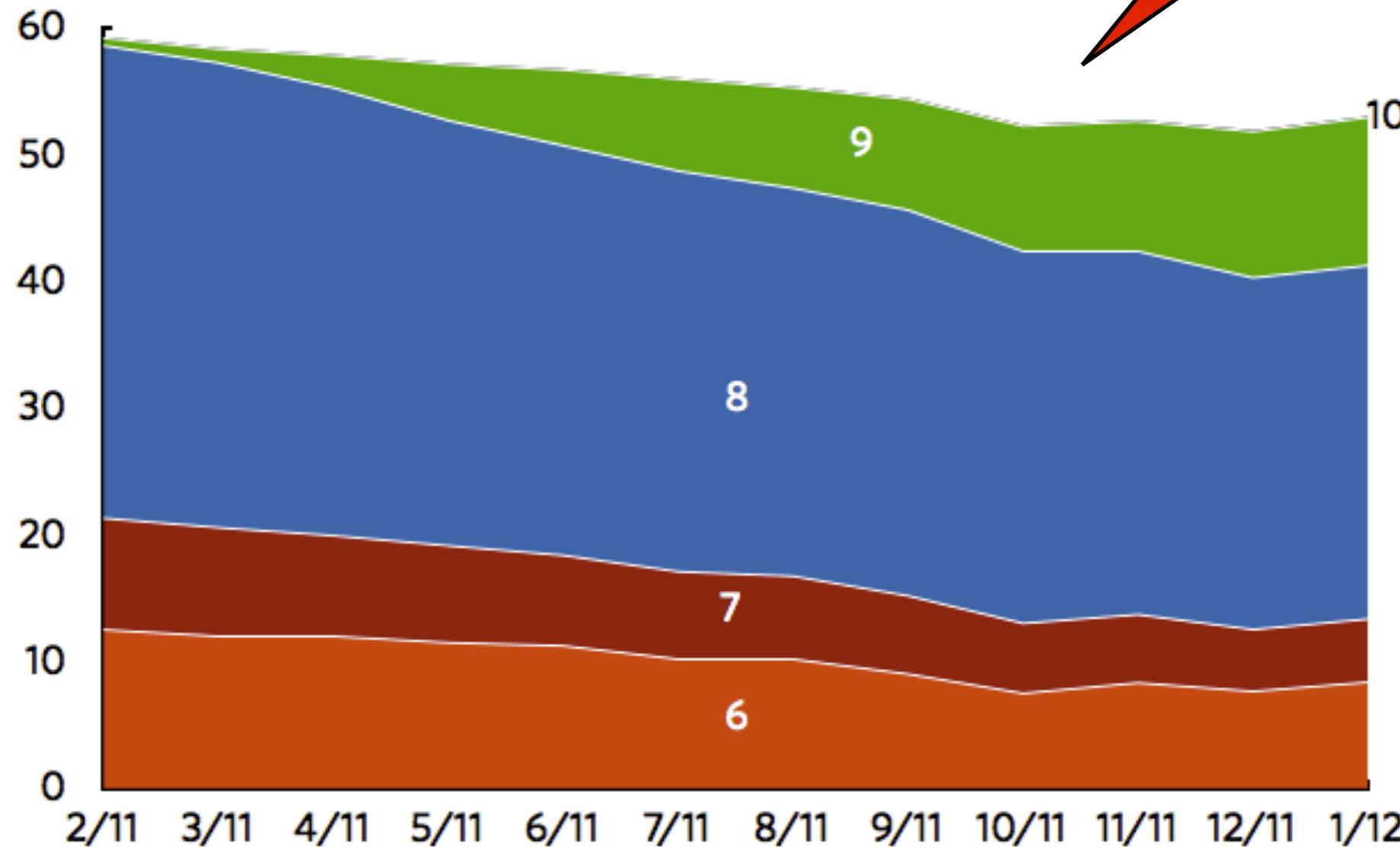


http://www_unixmen_com/browser-war-heats-up-again-as-chrome-unseats-ie-for-may-2012/

Support for
different versions

Internet Explorer version adoption

Percent



<http://arstechnica.com/business/2012/02/2001-all-over-again-internet-explorer-6-share-grows-and-chrome-falls/>

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Support for different platforms

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By Burbn, Inc.
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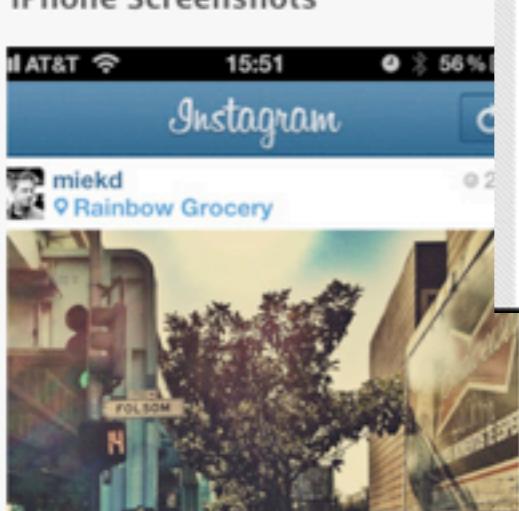
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★★★★★ Instagram
80 million users love Instagram! It's a free, fun,
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What's New in Version 3.0.0
– View your photos on a map (visit your profile on the map)
– Redesigned profile screen

[View In iTunes](#)

Free
Category: Photo & Video
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Version: 3.0.0
Size: 14.8 MB
Languages: English, Chinese, French, German, Italian, Japanese, Korean, Portuguese, Spanish
Seller: Burbn, Inc.
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iPhone Screenshots



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Instagram
Instagram
INSTALLED
★★★★★ (1,750,181)

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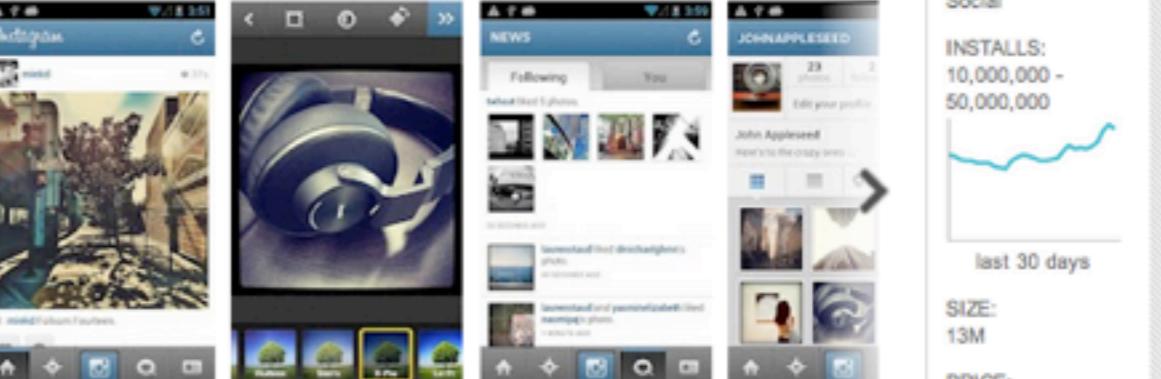
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Share your photos in a simple photo stream with friends to see - and follow your friends' photos with the click of a single button. Every day you open up Instagram, you'll see new photos from your closest friends, and creative people from around the world.

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App Screenshots



last 30 days

ABOUT THIS APP
RATING: ★★★★★ (1,750,181)
UPDATED: August 17, 2012
CURRENT VERSION: 3.0.5
REQUIRES ANDROID: 2.2 and up
CATEGORY: Social
INSTALLS: 10,000,000 - 50,000,000
SIZE: 13M
PRICE:



Search



SHOP

MY MUSIC

MY BOOKS

MY MAGAZINES

MY MOVIES & TV

MY ANDROID APPS

Instagram

Instagram

★★★★★
(1,750,181)

INSTALLED

This app is compatible with all
of your devices. [\[+\]](#)

Users who viewed this also viewed



Facebook

FACEBOOK

★★★★★ (4,658,636)

Free



Twitter

TWITTER, INC.

★★★★★ (498,063)

Free



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OVERVIEW

USER REVIEWS

WHAT'S NEW

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Description

Instagram – A beautiful way to share your world. It's fast, free and fun!

Pick from one of several gorgeous filtered effects to breathe a new life into your mobile photos. Transform everyday moments into works of art you'll want to share with friends and family.

Share your photos in a simple photo stream with friends to see - and follow your friends' photos with the click of a single button. Every day you open up Instagram, you'll see new photos from your closest friends, and creative people from around the world.

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ABOUT THIS APP

RATING:

★★★★★

(1,750,181)

UPDATED:

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CURRENT

VERSION:

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2.2 and up

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last 30 days

SIZE:

13M

PRICE:



Store

Mac

iPod

iPhone

iPad

iTunes

Support



iTunes Preview

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Infrequent/Mild

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Infrequent/Mild Alcohol, Tobacco, or Drug Use or References

Description

Instagram

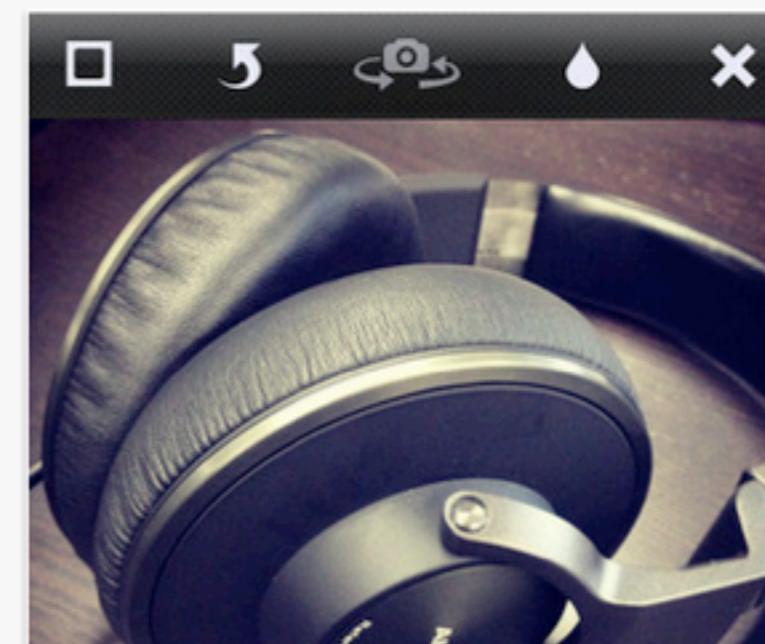
80 million users love Instagram! It's a free, fun, and simple way to make and share gorgeous photos on your

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What's New in Version 3.0.0

- View your photos on a map (visit your profile and tap Photo Map to select which of your photos will be viewable on the map)
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iPhone Screenshots



www.microsoft.com/silverlight/



Microsoft®
Silverlight

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Top 5 Tools for Multi-Platform Mobile App Development

Useful Tools for Cross-Platform Mobile Apps

By [Priya Viswanathan](#), About.com Guide

1. [RhoMobile](#)



2. [PhoneGap](#)



3. [Appcelerator](#)



5. [WidgetPad](#)



4. [MoSync](#)



Reliance on cross-platform tools

<http://mobiledevices.about.com/od/mobileappbasics/tp/Top-5-Tools-Multi-Platform-Mobile-App-Development.htm>

```
<html>
<head>
  <title>HelloWorld Application</title>
</head>
<body>
  <p>
    Hello, World!
  </p>
</body>
</html>
```

‘HTML-centric’
as opposed to
‘General Purpose
Language’-centric

```
public class HelloWorldApplication {

  public static void main(String[] args) {
    System.out.println("Hello, World!");
  }
}
```

Recommended resources: ‘HTML5 for the Java developer’

<http://www.youtube.com/watch?v=l-GD4ro9fh4>

<http://www.youtube.com/watch?v=2msljsoQcls>

Anything else you want
to emphasize as a
characteristic?

Background check regarding audience

- Are you a (near-to) ‘developer’?
- Are you accustomed reading code (in Java, ...)?
- Are you accustomed with HTML (XML, JSON)?
- Do you want to try out things during the course?
- Any expectations that you want make heard now?

So then,
how to do a course
on web programming?

Too much software technologies.

Too much software languages.

Too little time.



Do a course on ‘modern’ Web programming!

- In

- **HTML5**
- **JavaScript**
- **Ruby On Rails**

- Out

- Struts
- JSP, JSF, JWhatEver
- ASP.NET

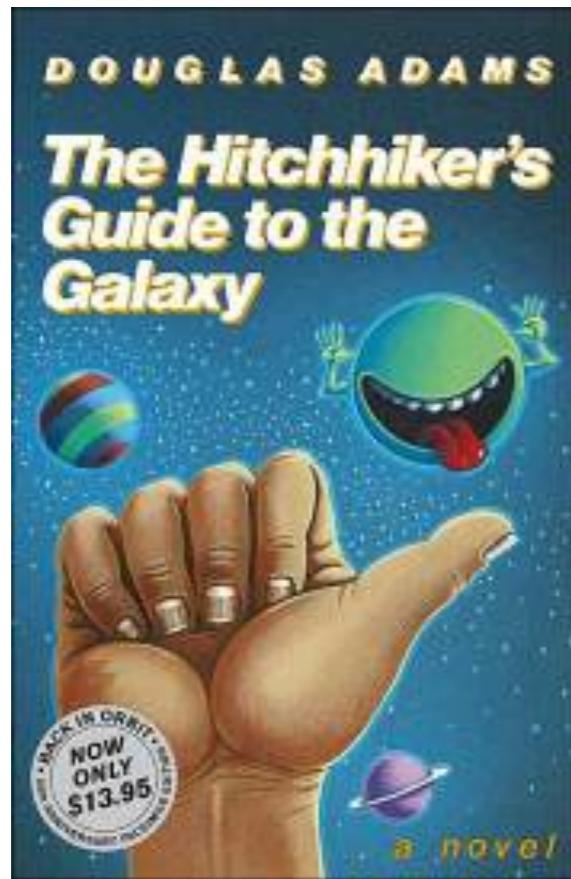
- **Collateral damage**

- Silverlight
- Android SDK
- Objective C
- Seaside
- other ‘smart’ stuff
- Zend
- Pyjamas
- other cool frameworks

Use 101 companies throughout the course!

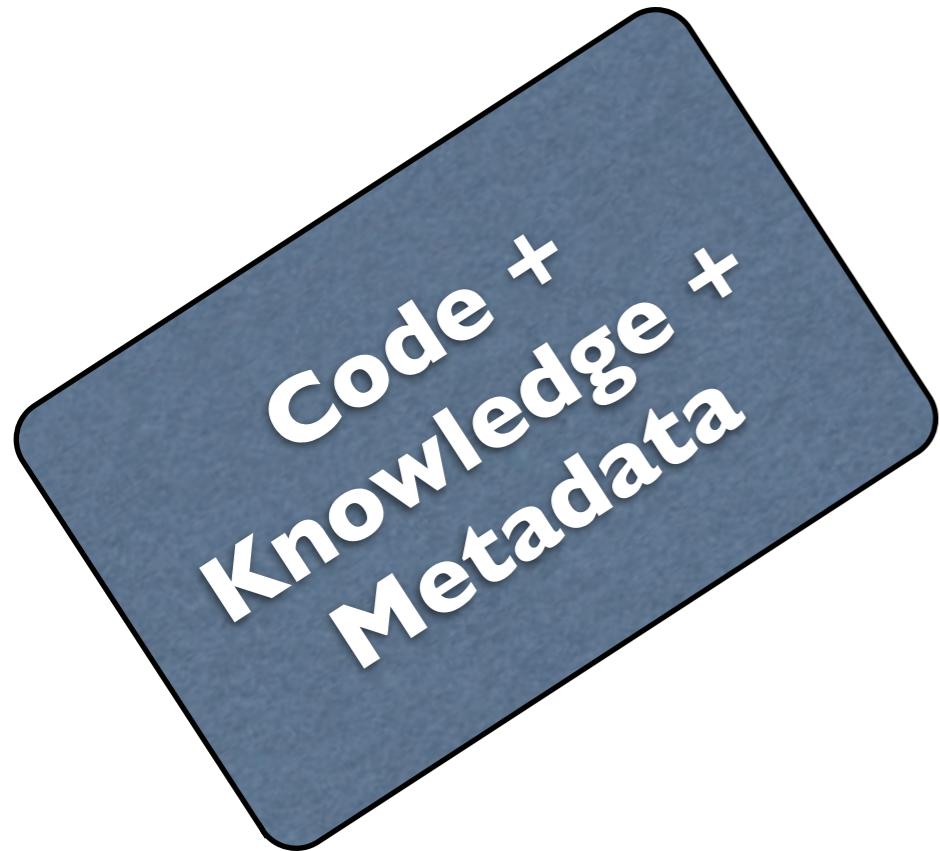
<http://101companies.org>

The Hitchhiker's Guide to the **Software** Galaxy



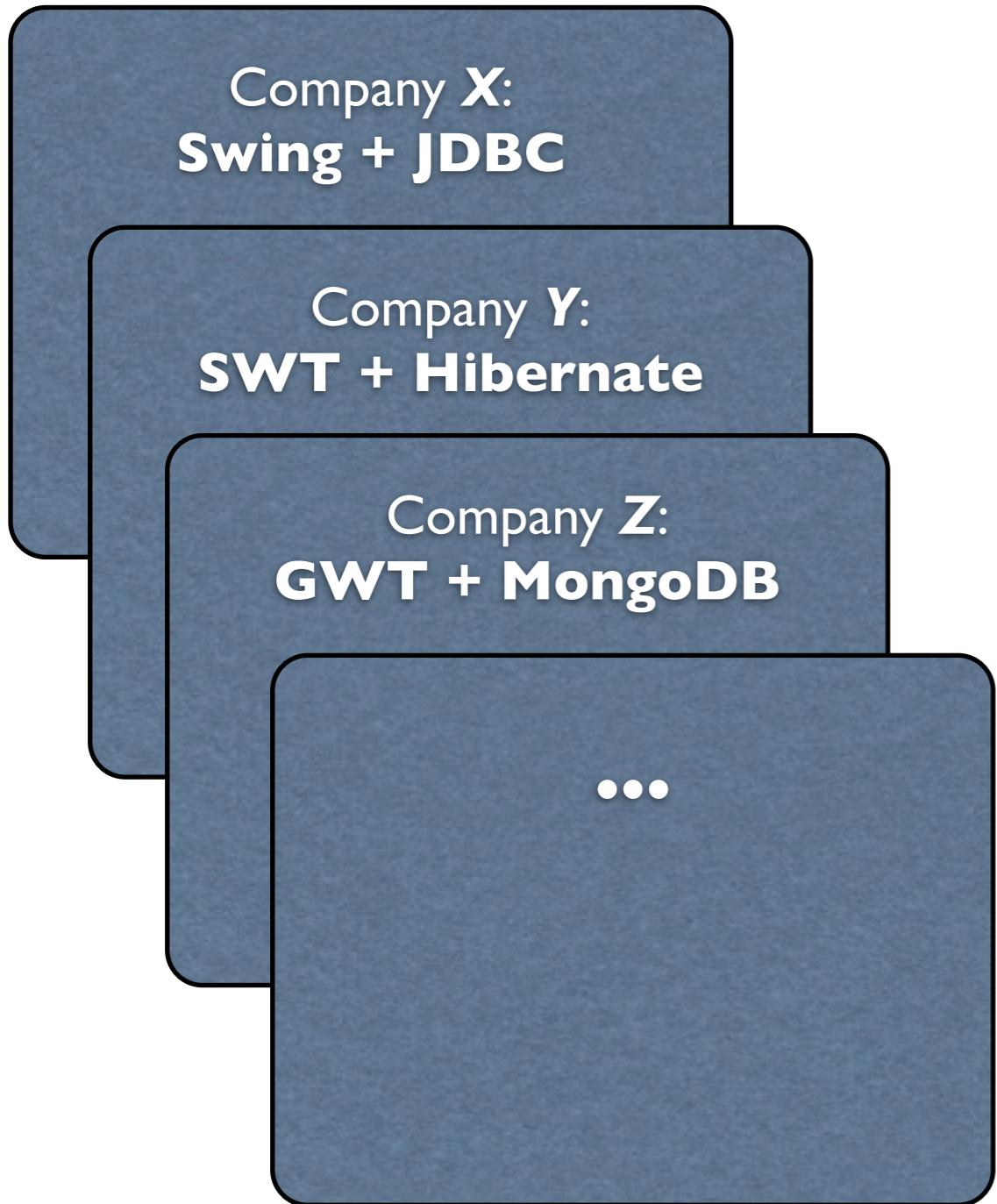
Wannabe Wikipedia for Software Developers. :-)

What's 101companies?



A **community project** aiming at a **knowledge base** about software **technologies and languages** based on implementations of a human-resources management system.

Why is it called “101 companies”?

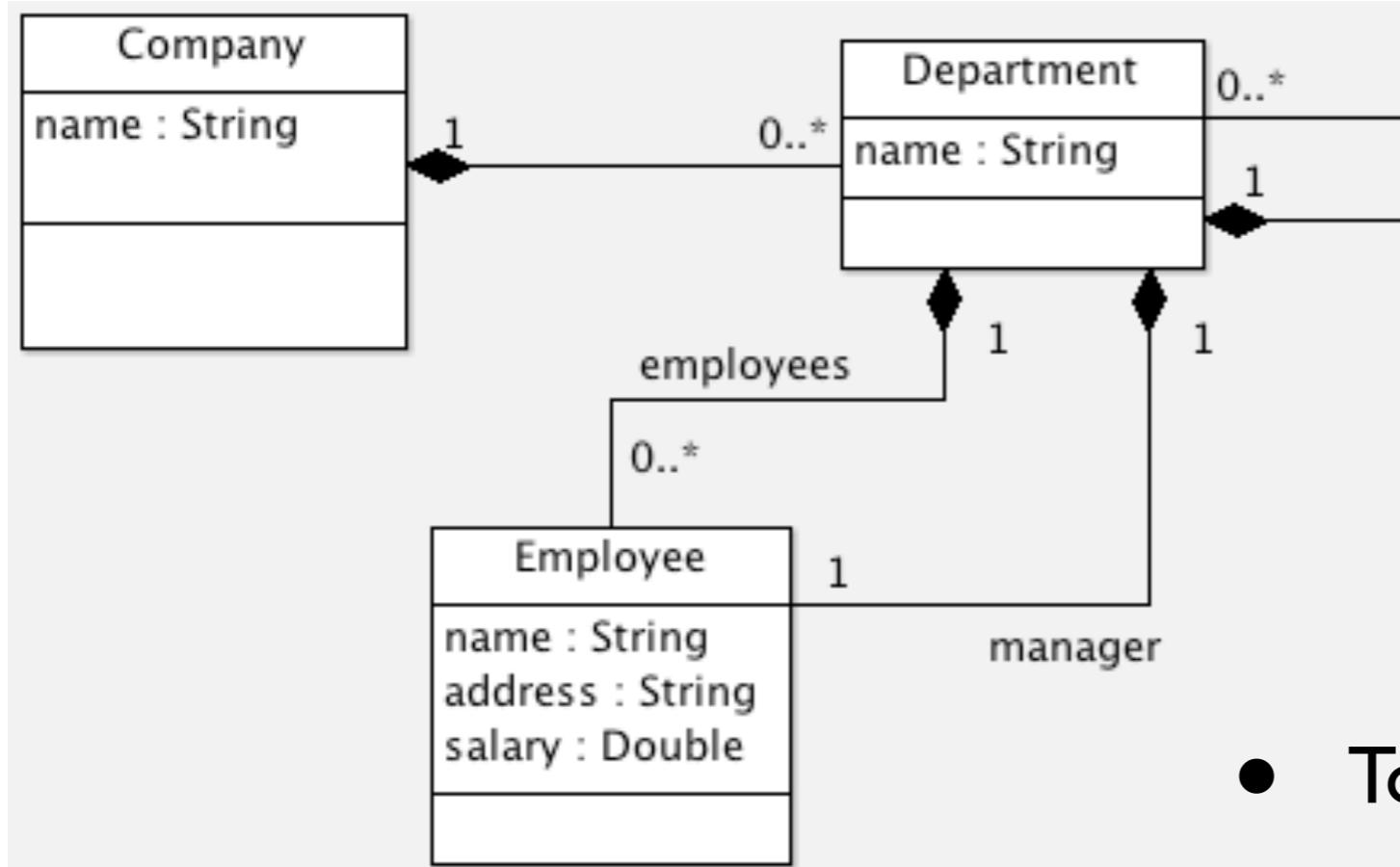


“101 ways of building a HRMS.”

or

“Building a HRMS for 101 companies.”

A Human Resources Management System



- Total salaries
- Increase salaries
- Cut salaries
- Edit employee data
- Import / export company data

Languages exercised by 101

- Java
- **JSON**
- Text
- WSDL
- C#
- Ecore
- Markdown
- Rascal
- VB.NET
- PHP
- Prolog
- **JavaScript**
- Python
- **PHP4**
- F#
- 101meta
- **XML**
- PHP5
- Perl
- **Ruby**
- GIF
- SQL
- CSS
- C++
- Haskell
- .sh
- XMI
- Cobol
- **XHTML**
- PNG
- AspectJ
- (make)
- .properties
- ATL
- Smalltalk
- (Ant)
- .ini
- **XSD**
- JAR
- ...
- **HTML**
- Scala
- Erlang

Technologies exercised by 101

- make
- Eclipse
- SOA
- Java RMI
- Ant
- Hibernate
- JPA
- JDBC
- Maven
- Java collections
- EMFCompare
- zip
- sbt
- VS
- I01explorer
- jEdit
- JAXB
- java.util
- Mediawiki
- jdom
- xjc
- java.io
- hackage
- w3c.dom
- EF
- java.lang.reflect
- cabal
- dom4j
- xsd.exe
- LINQ
- ghci
- xom
- XmlSerializer
- System.Xml
- ghc
- SAX
- ANTLR
- System.Xml.Linq
- Swing
- ...
- javac
- ADO
- AWT

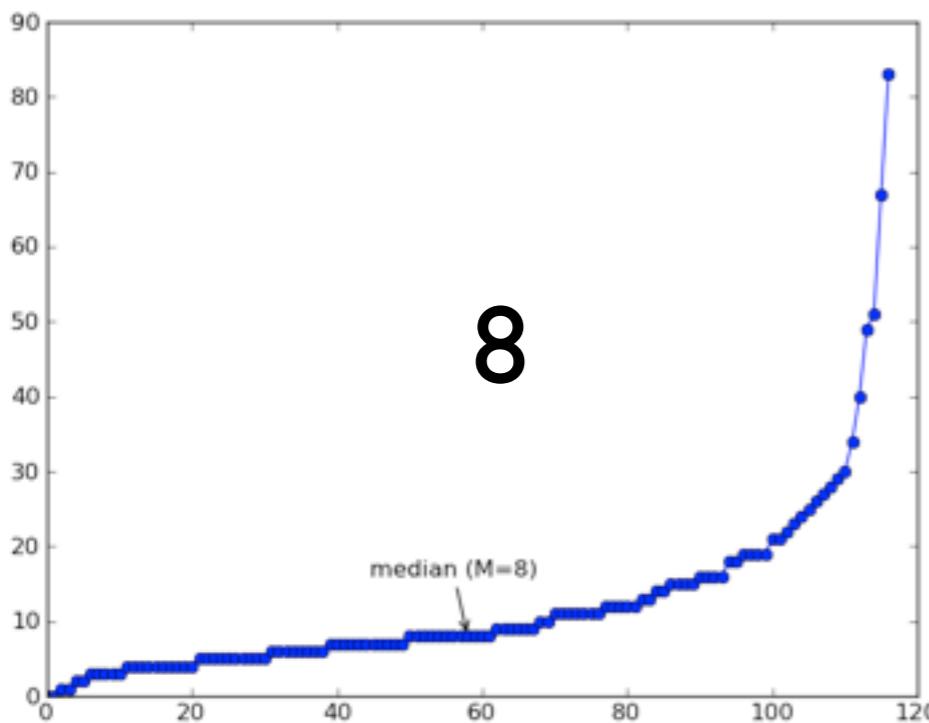
Some technological spaces covered

- Objectware
- Modelware
- Grammarware
- XMLware
- Ontoware
- Tableware
- ...

Technological space

= Technology and community context in software engineering

The 101companies Repository



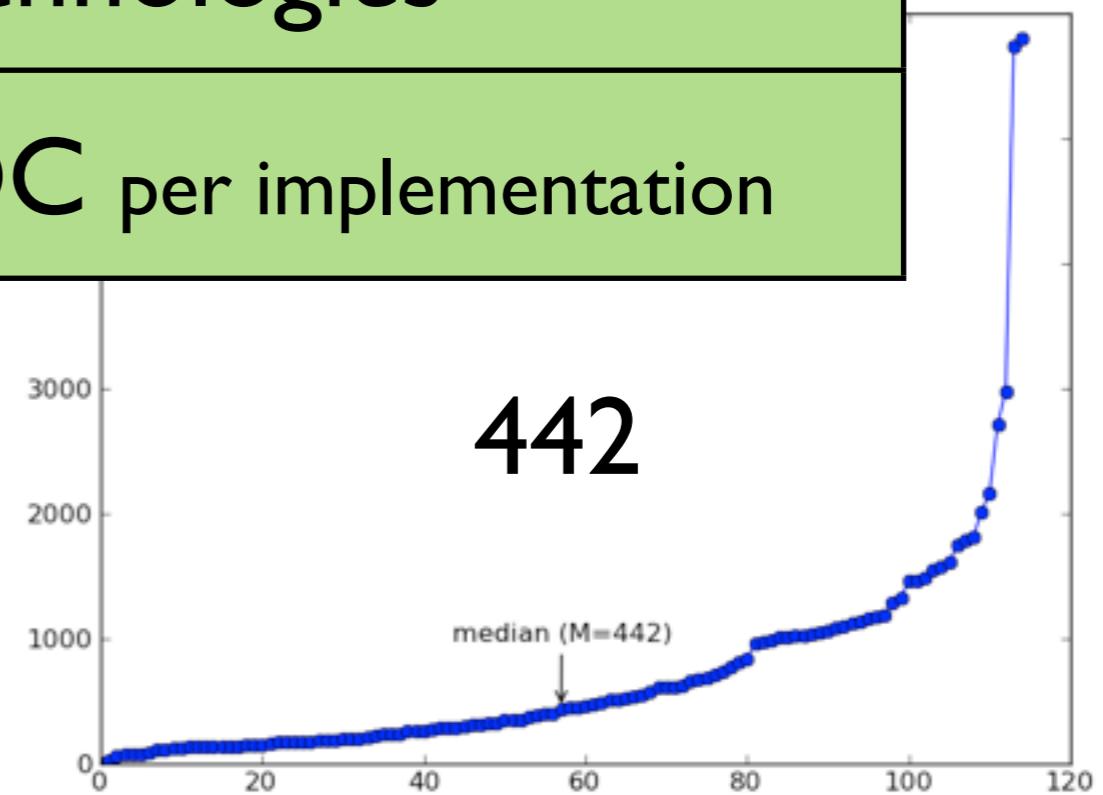
#Files per implementation

Technologies

Languages

LOC per implementation

Java
XML Haskell
HTML
XHTML CSS
JavaScript
CSharp
HTML5
JSON
SQL
XSD
PHP
Scala
HQL
CSS
JSON
XHTML
Smalltalk
HTML
JavaScript
CSharp
HTML5



The 101companies Wiki

<http://101companies.org/>

- The **features** of the 101companies System
- The **implementations** of the 101companies System
- Contributors of 101contributions; see also wiki users
- The **stakeholders** of 101companies Project
- Some **themes** of contributions
- Some **ideas** for contributions
- The **data** exposed by the 101companies Project
- The **ontology** of the 101companies Project
- More **resources** on the 101companies Project

Extended demo:
let's look at
some of these
wiki subjects!

Consider 101companies' value for knowledge acquisition

- 101companies contribution X ...
 - ... uses language L ,
 - ... uses technology T ,
 - ... implements feature F ,
 - ... demonstrates concept C .
- Technology T helps with feature F .
- Technology T_1 always occurs together with technology T_2 .
- Developer D has skills regarding language L and technology T .
- ...

Direct, declared knowledge

Indirect, inferrable knowledge

Implementations for today

- 101implementation:php
- 101implementation:html5local
- 101implementation:rubyonrails
- 101implementation:html5XMLHttpRequest

We may drill into additional
ones as we see fit.

Category:Web theme

Path: Base → 101companies → 101main → 101theme → **Web theme**

Intent

--- **Web programming theme of implementations** ---

That's another possible outline, but not ours!

Description

There is a myriad of web-programming frameworks. This theme features implementations that demonstrate arguably the most established frameworks, while at the same time aiming at coverage of different languages and platforms. For instance, [Silverlight](#) may currently count as a major web-programming approach for the [.NET](#) platform, and hence, an implementation was included. Also, [PHP](#) is generally popular for web development, and hence, an implementation based on the popular [Pyjamas](#) framework was included. As far as [Java](#) is concerned, there are again, in turn, many different approaches and frameworks, and the goal was here to select a small number of different and popular approaches. Finally, in the case of [HTML5](#), the two options of a local applications versus a client/server architecture is demonstrated.

Classification

[–] Web theme

[gwt](#)

[happstack](#)

[html5ajax](#)

[html5local](#)

[jsf](#)

[pyjamas](#)

[seaside](#)

[silverlight](#)

[strutsAnnotation](#)

[zend](#)

- [Web programming theme of implementations](#)
 - [Web programming in Java with GWT](#)
 - [Web programming in Haskell with Happstack](#)
 - [Web programming based on the HTML5 ecosystem using Ajax style](#)
 - [Web programming based on the HTML5 ecosystem with local Web storage](#)
 - [Web programming with JSF](#)
 - [Web programming in Python with Pyjamas](#)
 - [Web programming in Smalltalk with Seaside](#)
 - [Web programming in C# with Silverlight](#)
 - [Web programming in Java with Struts configuring with annotations](#)
 - [Web programming in PHP with the Zend framework](#)

Classification

[–] Web theme

gwt

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- Web programming theme of implementations
 - Web programming in Java with [GWT](#)
 - Web programming in Haskell with [Happstack](#)
 - Web programming based on the [HTML5](#) ecosystem using [Ajax](#) style
 - Web programming based on the [HTML5](#) ecosystem with local [Web storage](#)
 - Web programming with [JSF](#)
 - Web programming in Python with [Pyjamas](#)
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 - Web programming in C# with [Silverlight](#)
 - Web programming in Java with [Struts](#) configuring with annotations
 - Web programming in PHP with the [Zend framework](#)

http://101companies.org/index.php/Category:Web_theme

Please come involved!

Even more Web applications

http://101companies.org/index.php/101feature:Web_UI

101feature:Web UI

Path: Base → 101companies → 101main → 101feature → UI 101feature → **Web UI**

Headline

--- A web-based user interface ---

Description

The feature applies when an implementation of the [101companies System](#) uses a Web-based user interface subject to execution in a [Web browser](#). Such a Web-based implementation may be a self-contained local implementation or it may rely on [distribution](#) such that it accesses remote data and operations on an appropriate server; see [Distribution](#).

Citations

Contributions

- ▶ [101implementation:gwt](#)
- ▶ [101implementation:gwtTree](#)
- ▶ [101implementation:happstack](#)
- ▶ [101implementation:html5XMLHttpRequest](#)
- ▶ [101implementation:html5ajax](#)
- ▶ [101implementation:html5indexedDatabase](#)
- ▶ [101implementation:html5local](#)
- ▶ [101implementation:html5session](#)
- ▶ [101implementation:html5tree](#)
- ▶ [101implementation:jsf](#)
- ▶ [101implementation:php](#)
- ▶ [101implementation:pyjamas](#)
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- ▶ [101implementation:silverlight](#)
- ▶ [101implementation:strutsAnnotation](#)
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Even more Web applications

http://101companies.org/index.php/101feature:Web_UI

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- ▶ [101implementation:strutsAnnotation](#)
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Table of contents

- HTTP Protocol
- Common Gateway Interface (CGI)
- Server-side scripting with Apache and PHP
- REpresentational State Transfer (REST)
- Model-View Controller with Ruby on Rails
- JavaScript
- Asynchronous JavaScript and XML (AJAX)
- Cascading Style Sheets (CSS)
- node.js

**Thanks for your interest.
Let's discuss during the break.**